

**IOWA DNR PROJECT # 14-04-78-03**

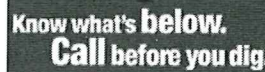


## ENGINEERING BUREAU CHIEF

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DIA	- DIAMETER
EL	- ELEVATION
FL	- FLOW LINE
FES	- FLARED END SECTION
TN	- TON
CY	- CUBIC YARD
SY	- SQUARE YARD
LS	- LUMP SUM
LBS	- POUNDS
PZ	- PIEZOMETER
O.C.	- ON CENTER
MIN	- MINIMUM
EA	- EACH
R	- RADIUS
SP	- STAKING POINT
FT	- FEET
Typ	- TYPICAL
SWPPP	- STORM WATER POLLUTION PREVENTION PLAN
BMP	- BEST MANAGEMENT PRACTICE

\_\_\_\_\_ 1380 \_\_\_\_\_ EXISTING MAJOR CONTOURS  
 \_\_\_\_\_ 1378 \_\_\_\_\_ EXISTING MINOR CONTOURS  
 \_\_\_\_\_ TARGET POOL ELEVATION 967  
 \_\_\_\_\_ PIPE CORRIDOR BOUNDARY  
 \_\_\_\_\_ PARK BOUNDARY  
 \_\_\_\_\_ EXISTING TREE MASS  
 \_\_\_\_\_ TRANSMISSION WATER MAIN  
 W W  
 SS SS  
 OHE OHE  
 \_\_\_\_\_ SANITARY FORCE MAIN  
 \_\_\_\_\_ OVERHEAD ELECTRIC



BID ITEM DESCRIPTION	UNITS	TOTAL
MOBILIZATION/DE-MOBILIZATION	LS	1
IN-LAKE BUOY/PARK SAFETY PLAN	LS	1
STORMWATER POLLUTION PREVENTION PLAN	LS	1
HANDLING OF WATER	LS	1
INSTRUMENTATION - PIEZOMETER REPAIRS	EA	3
INSTRUMENTATION - PIEZOMETER DATA LOGGERS	EA	11
INSTRUMENTATION - MOSQUITO CREEK INSTRUMENTATION	LS	1
INSTRUMENTATION - UPPER INDIAN CREEK INSTRUMENTATION	LS	1
INSTRUMENTATION - LOWER INDIAN CREEK INSTRUMENTATION	LS	1
INSTRUMENTATION - LAKE PIEZOMETER AND STAFF GAUGE	LS	1
INSTRUMENTATION - TIPPING BUCKET RAIN GAUGE SYSTEM	LS	1
SEEDING	LS	1
REMOVE AND DISPOSE OF SEDIMENT	CY	500,000
ALTERNATE #1 FOR REMOVE AND DISPOSE OF SEDIMENT		
DREDGED SAND STOCKPILE "A"	CY	300,000
DREDGED SAND STOCKPILE "B"	CY	200,000

1. THE LOCATIONS OF ALL OVERHEAD AND UNDERGROUND UTILITY FACILITIES ARE APPROXIMATE OR MAY NOT BE INDICATED IN THESE PLANS. UNDERGROUND FACILITIES, WHETHER INDICATED OR NOT, SHALL BE LOCATED AND FLAGGED BY THE CONTRACTOR AND UTILITY COMPANIES 48 HOURS BEFORE WORK IS STARTED. VERIFY UTILITY LOCATIONS BY CONTACTING IOWA ONE CALL (ONLINE AT [WWW.IOWAONECALL.COM](http://WWW.IOWAONECALL.COM) AND/OR CALL 800-292-8989 OR 811). THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY AND COORDINATE ALL NECESSARY UTILITY SERVICE INTERRUPTIONS WITH THE OWNERS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT ALL EXISTING UTILITIES, PAVEMENT, STRUCTURES, FENCES, POLES, SIGNS, TREES, IRRIGATION LINES, SPRINKLER HEADS, SUB- DRAINS AND OTHER IMPROVEMENTS NOT DESIGNATED FOR REMOVAL. ANY DAMAGE CAUSED BY THE CONTRACTORS OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
2. BATHYMETRY CONTOURS SHOWN ON THE PLAN ARE 1' INTERVALS. REMAINING UPLAND CONTOURS SHOWN ON THE PLANS ARE 2' INTERVALS ASSUMED FROM LIDAR DATA. ELEVATIONS CALLED OUT ON THE PLANS ARE REFERENCED TO NAVD 88 VERTICAL DATUM. HORIZONTAL CONTROL IS SHOWN IN NAD83 IOWA STATE PLANE SOUTH.
3. CLEARING AND GRUBBING TO BE PERFORMED ONLY IN LOCATIONS ABSOLUTELY NECESSARY TO CONSTRUCT AND ACCESS THE SITE FEATURES. ONLY TREES/VEGETATION MARKED BY ENGINEER MAY BE REMOVED. CONTRACTOR SHALL LIMIT CONSTRUCTION OPERATIONS WITHIN THE CONSTRUCTION LIMITS SHOWN ON PLANS.
4. LIMITS OF CONSTRUCTION SHALL BE WITHIN STAGING AREAS AND CORRIDORS IDENTIFIED ON THE PLANS, OR AS APPROVED IN CONTRACTOR'S SUBMITTED ALTERNATIVE.
5. CONTRACTOR CAN SUBMIT ALTERNATIVE CONSTRUCTION LIMITS FOR ENGINEERS APPROVAL WITHIN THE PARK BOUNDARY BY COORDINATING WITH FIELD ENGINEER. CONTRACTOR WILL NOT BE REIMBURSED FOR ADDITIONAL SEEDING OR CLEARING AND GRUBBING UNLESS ALTERNATIVE LIMITS ARE APPROVED PRIOR TO CONSTRUCTION.
6. ALL RUBBLE DEBRIS FROM CONSTRUCTION ACTIVITIES MUST BE REMOVED FROM THE SITE UPON PROJECT COMPLETION. ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL CONDITIONS BY SMOOTHING COMPACTED SOILS PRIOR TO FINISHED GRADING AND SEEDING WITH PROPERTY OWNERS SPECIFIED MIX. AREAS OF WORK COMPLETED PRIOR TO THE SEEDING SEASON MUST BE PROTECTED WITH MULCH.
7. THE CONTRACTOR SHALL NOT ALLOW PONDING OF WATER WITHIN THE CONSTRUCTION AREA OUTSIDE OF THE DRAWDOWN POOL AT ANY TIME. MAINTAIN ALL EXISTING DRAINAGE PATTERNS.
8. THE CONTRACTOR SHALL CONDUCT ALL OPERATIONS AND MAINTAIN CONSTRUCTION WORK AREA IN A SAFE MANNER IN ACCORDANCE WITH OSHA REGULATIONS.
9. CONTRACTOR TO COORDINATE WITH FIELD ENGINEER ON POTENTIAL MODIFICATIONS TO THE LIMITS OF CONSTRUCTION BASED ON FIELD CONDITIONS.

CONTACT INFORMATION			
ENTITY	CONTACT NAME	PHONE	EMAIL
FYRA ENGINEERING	MIKE SOTAK	402-502-7131	MSOTAK@FYRAENGINEERING.COM
COUNCIL BLUFFS WATER WORKS	DOUG DRUMMEY	712-328-1006	DDRUMMEY@CBWATERWORKS.COM
LEEVE DISTRICTS	MATT COX	712-328-4623	MCOX@COUCILBLUFFS-IA.GOV
CITY OF COUNCIL BLUFFS	MATT COX	712-328-4624	MCOX@COUCILBLUFFS-IA.GOV
LAKE MANAWA STATE PARK	DANIEL JACOBS	712-366-0220	DANIEL.JACOBS@DNR.IOWA.GOV
MIDAMERICAN ENERGY	TOM SACCAMAN	712-366-5353	TSACCAMAN@MIDAMERICAN.COM
DNR ENGINEER	MARK JOHNSON	515-250-3713	MARK.JOHNSON@DNR.IOWA.GOV

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BY \_\_\_\_\_

REVISIONS

No.

COVER SHEET

2015 LAKE MANAWA DREDGING  
IOWA DEPARTMENT OF NATURAL RESOURCES

2015

POTTAWATTAMIE COUNTY, IOWA

DESIGNED BY: SEM  
DRAWN BY: DEJ  
CHECKED BY: SEM  
A / QC BY: MKS  
PROJECT NO.: 007.12.01  
DATE: JUNE 2015

SHEET NO.





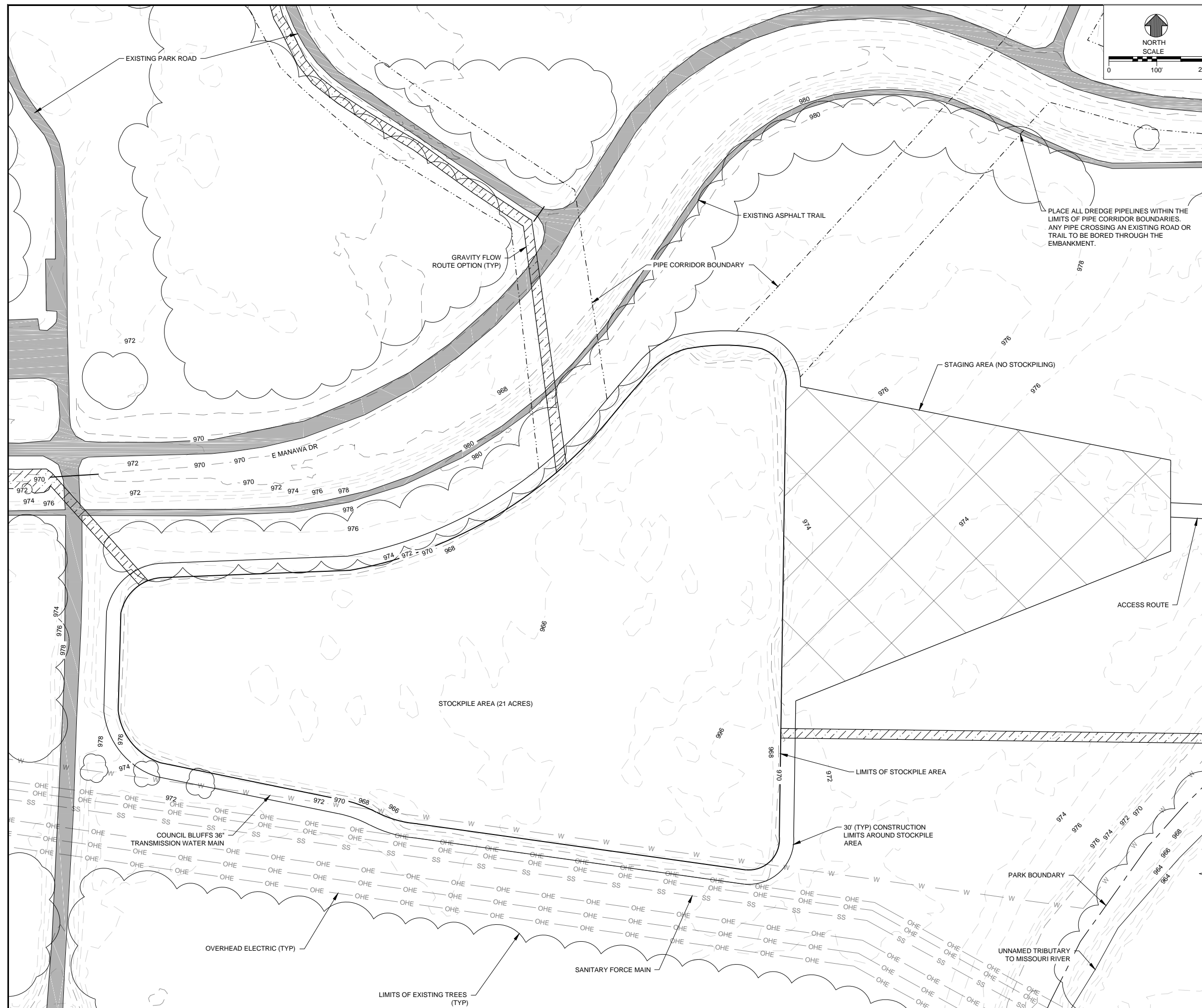
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PROJECT PLAN		2015	
2015 LAKE MANAWA DREDGING		POTTAWATTAMIE COUNTY, IOWA	
IOWA DEPARTMENT OF NATURAL RESOURCES			

DESIGNED BY: \_\_\_\_\_ SEM  
DRAWN BY: \_\_\_\_\_ DEJ  
CHECKED BY: \_\_\_\_\_ SEM  
QA / QC BY: \_\_\_\_\_ MKS  
PROJECT NO.: 007.12.01  
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**STOCKPILE NOTES:**

FYRA  
ENGINEERING

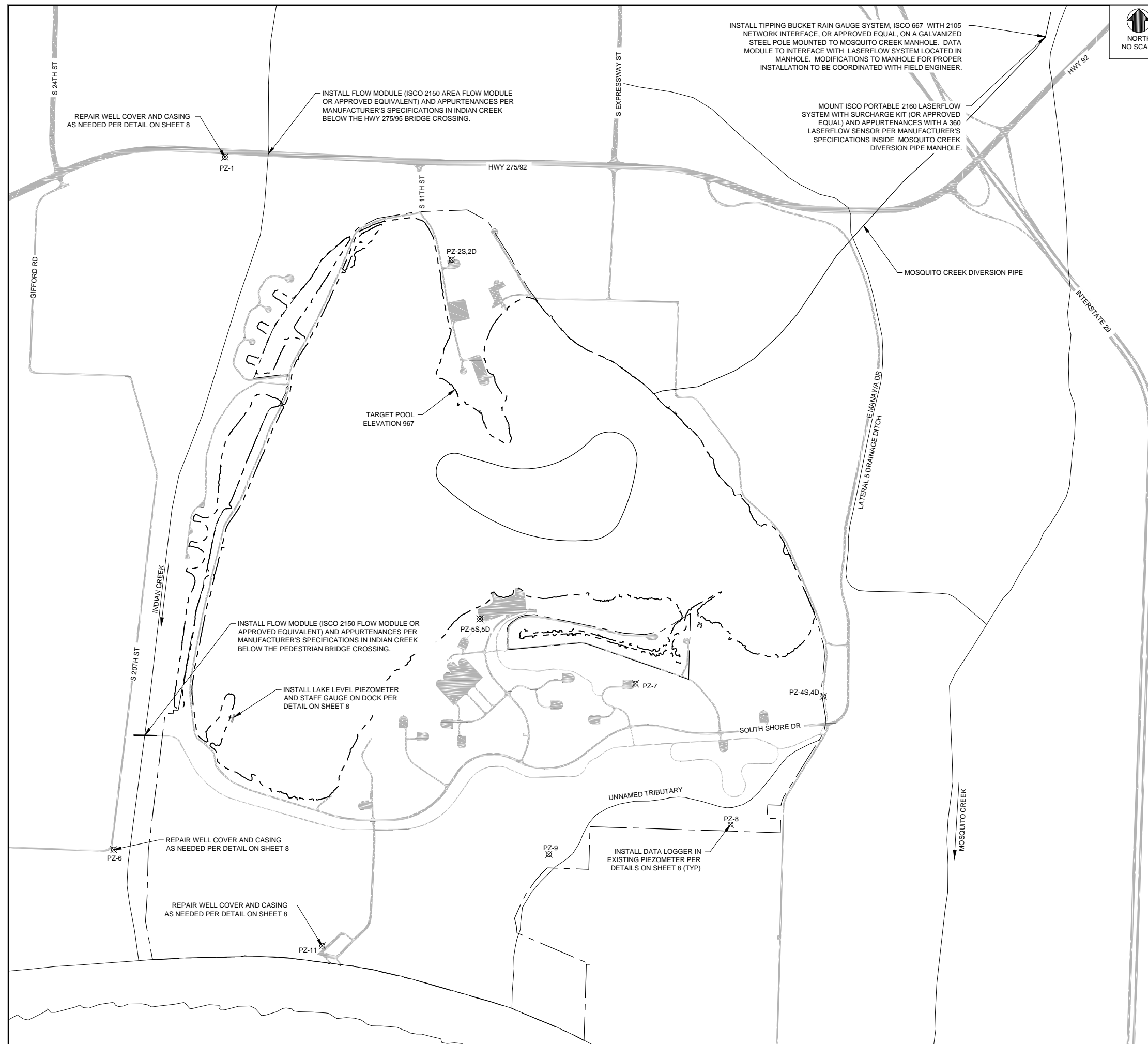
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STOCKPILE PLAN	
2015 LAKE MANAWA DREDGING	
IOWA DEPARTMENT OF NATURAL RESOURCES	
POTTAWATTAMIE COUNTY, IOWA	2015

DESIGNED BY: \_\_\_\_\_ SE  
DRAWN BY: \_\_\_\_\_ D  
CHECKED BY: \_\_\_\_\_ SE  
QA / QC BY: \_\_\_\_\_ MI  
PROJECT NO.: \_\_\_\_\_ 007.12  
DATE: \_\_\_\_\_ JUNE 20







**OPERATION NOTES:**

1. CONTRACTOR IS TO INSTALL ALL DEVICES AND ENSURE EACH IS FUNCTIONING ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE OF ALL DEVICES UNTIL THE FINAL COMPLETION DATE. INCLUDES ADDITIONAL BATTERIES AND/OR CHARGING BATTERY SYSTEM FOR EACH DEVICE.
3. OWNER AND/OR FIELD ENGINEER IS RESPONSIBLE FOR DOWNLOADING DATA FROM THE DEVICES.

### INSTALLATION NOTES:

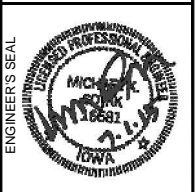
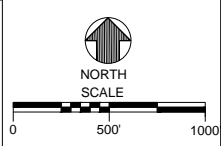
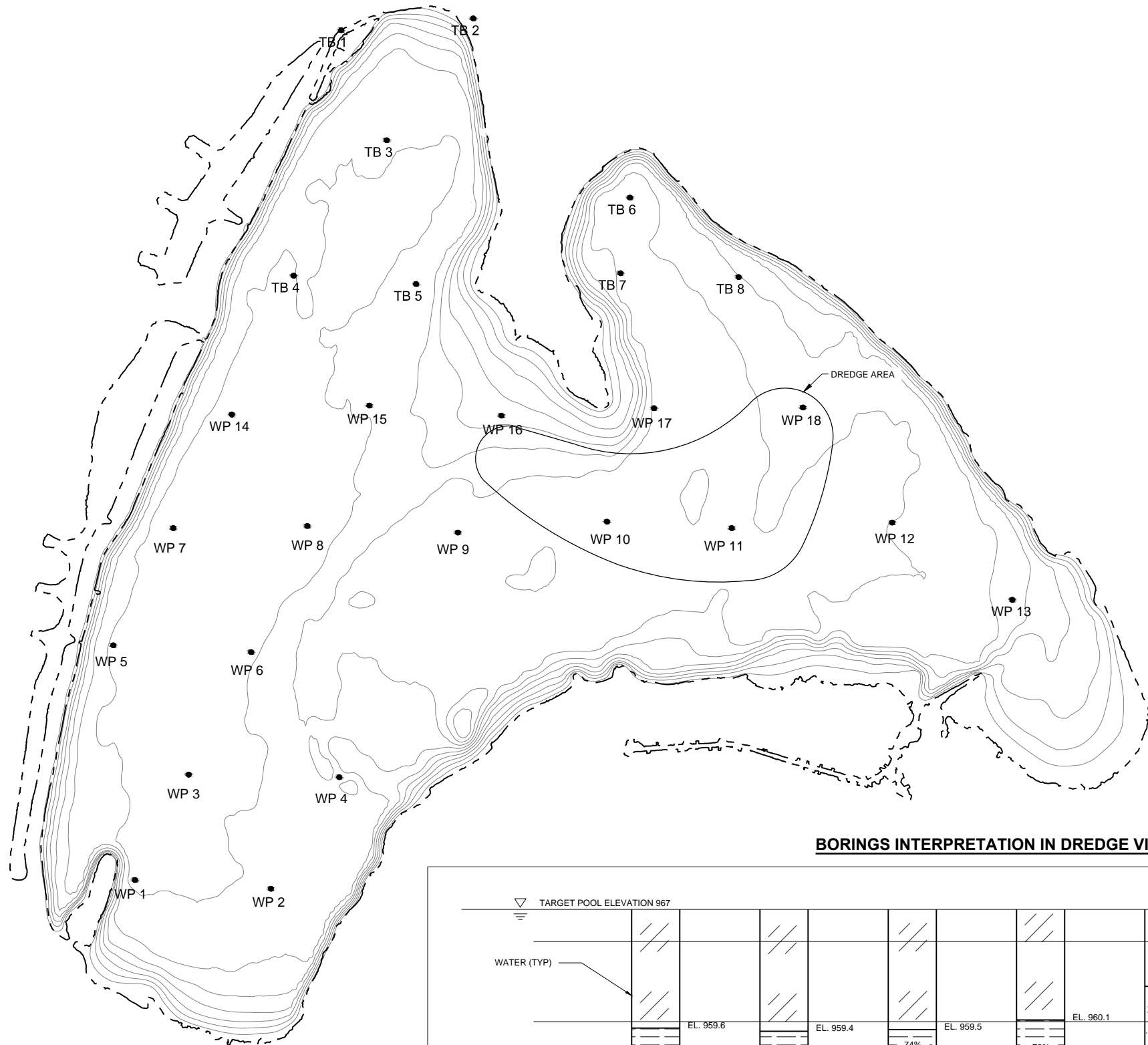
1. THE ISCO 2150 FLOW MODULE AND 2160 LASERFLOW SYSTEM INCLUDE THE FLOW /2191 BATTERY MODULE. ANY APPROVED EQUAL MUST CONTAIN ALL SIMILAR COMPONENTS.
2. MOSQUITO CREEK DIVERSION PIPE TO BE DE-WATERED FOR INSTALLATION OF INSTRUMENTATION INTO MANHOLE. CONTRACTOR TO COORDINATE DE-WATERING WITH IDNR PARK STAFF AND FIELD ENGINEER. PAST DE-WATERING EFFORTS HAVE INCLUDED AN INFLATABLE BLADDER INSTALLED DOWNSTREAM OF THE MANHOLE, CLOSING OF THE MOSQUITO CREEK DIVERSION INLET (BY IDNR) AND PUMPING OF THE MANHOLE.
3. LOCATIONS AND PLACEMENT OF FLOW MODULE IN CREEK TO BE COORDINATED WITH FIELD ENGINEER.
4. MOUNT VELOCITY SENSOR ON 1" STEEL PLATE AND ANCHOR INTO GROUND 4 FT DEEP MIN.
5. FACE VELOCITY SENSOR DOWNSTREAM. PROTECT SENSOR BY DRIVING TWO REBAR STAKES UPSTREAM OF SENSOR EXTENDING A MINIMUM OF 2' ABOVE, OR ALTERNATIVE METHOD APPROVED BY ENGINEER.
6. PROTECT FLOW/BATTERY MODULE WITH LOCKABLE WEATHER PROOF METAL BOX.
7. MOUNT BOX ON DOWNSTREAM FACE OF BRIDGE. LOCATION AND PLACEMENT TO BE COORDINATED WITH FIELD ENGINEER.
8. 150' OF CABLE EXTENSION REQUIRED TO EXTEND CABLE ALONG BANKLINE TO FLOW/BATTERY MODULE.
9. CABLE TO BE PROTECTED IN A RUBBER HOSE AND STAKED SECURELY TO THE BANKLINE.

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2015 LAKE MANAWA DREDGING	2015
IOWA DEPARTMENT OF NATURAL RESOURCES	
POTTAWATTAMIE COUNTY, IOWA	2015

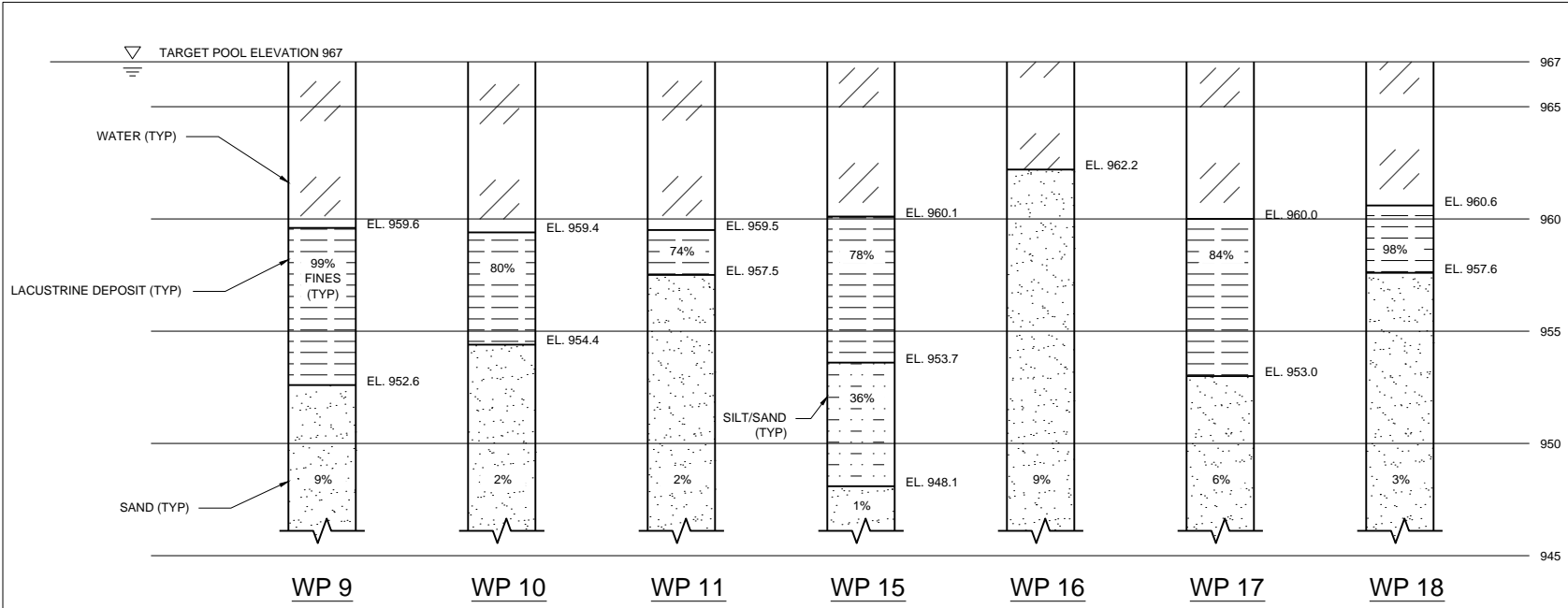
SIGNED BY: \_\_\_\_\_ SEM  
 WITNESSED BY: \_\_\_\_\_ DEJ  
 CHECKED BY: \_\_\_\_\_ SEM  
 APPROVED BY: \_\_\_\_\_ MKS  
 EFFECT NO.: \_\_\_\_\_ 007.12.01  
 \_\_\_\_\_ JUNE 2015





NO.	REVISIONS		BY	DATE

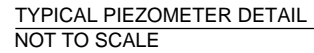
**BORINGS INTERPRETATION IN DREDGE VICINITY**



ALL WP PREFIX BORINGS ARE FROM REPORT STP-275-3(27)-2C-78 AUGUST 31, 2004 AND ALL TB PREFIX BORINGS ARE FROM REPORT IM-029-3(62)54--13-78 JANUARY 30, 2007. ELECTRONIC VERSIONS ARE AVAILABLE UPON REQUEST.

GEOLOGIC INFORMATION		
2015 LAKE MANAWA DREDGING		
IOWA DEPARTMENT OF NATURAL RESOURCES		
POTTAWATTAMIE COUNTY, IOWA		2015

DESIGNED BY: SEM  
DRAWN BY: DEJ  
CHECKED BY: SEM  
QA / QC BY: MKS  
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- ## PIEZOMETER REPAIR INSTRUCTIONS
1. BREAK UP AND REMOVE EXISTING CONCRETE SURROUNDING PIEZOMETER COVER AT GROUND SURFACE.
  2. REMOVE EXISTING STEEL PIEZOMETER COVER WHILE LEAVING EXISTING PVC PIEZOMETER RISER IN PLACE.
  3. REPLACE STEEL PIEZOMETER COVER WITH A NEW 4" X 4" STEEL PIEZOMETER COVER WITH A LOCKABLE CAP AS SHOWN IN THE ADJACENT DETAILS.
  4. POUR NEW CONCRETE AROUND THE INSTALLED RISER COVER AND MOUND CONCRETE MINIMUM 2" ABOVE EXISTING GROUND SURFACE.

Piezometer Number	Northing (ft)	Easting (ft)	Top of Casing Elevation (ft)	Depth to Top of Screen (ft)	Depth of Well (ft)	Repair Needed?
PZ-1	453228.26	988379.79	984.20	19.0	24.0	YES
P2-2D	451800.31	991525.23	973.28	24.0	29.0	NO
PZ-2S	451798.35	991516.07	973.36	8.0	13.0	NO
PZ-5D	446819.38	991918.63	977.57	25.0	30.0	NO
PZ-5S	446828.76	991915.40	977.35	10.0	15.0	NO
PZ-6	443619.12	986837.62	973.73	14.0	19.0	YES
PZ-7	445917.57	994074.79	977.21	10.0	15.0	NO
PZ-8	443962.43	995391.91	972.37	9.0	14.0	NO
PZ-9	443553.95	992870.76	978.74	14.5	19.5	NO
PZ-11	442282.26	989728.50	973.72	17.0	22.0	YES
Lake Level	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	NO

[illegible][illegible]

2013 LAKE MAINAWA DREDGING

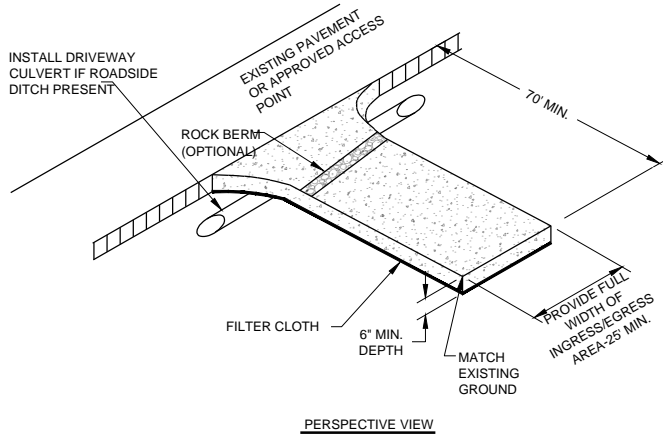
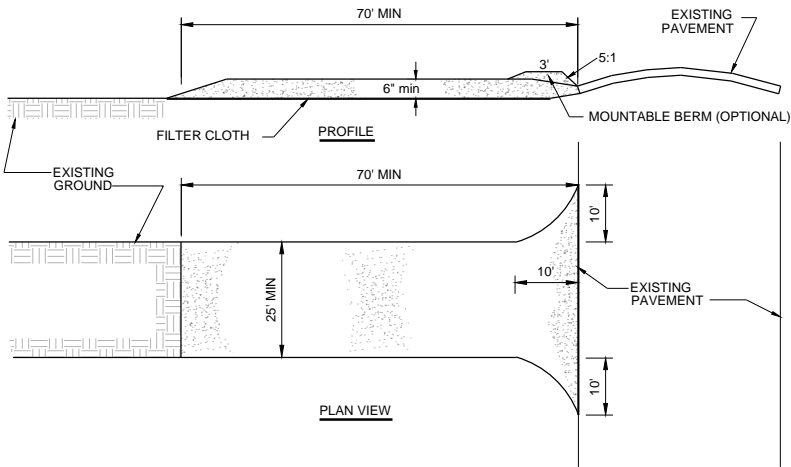
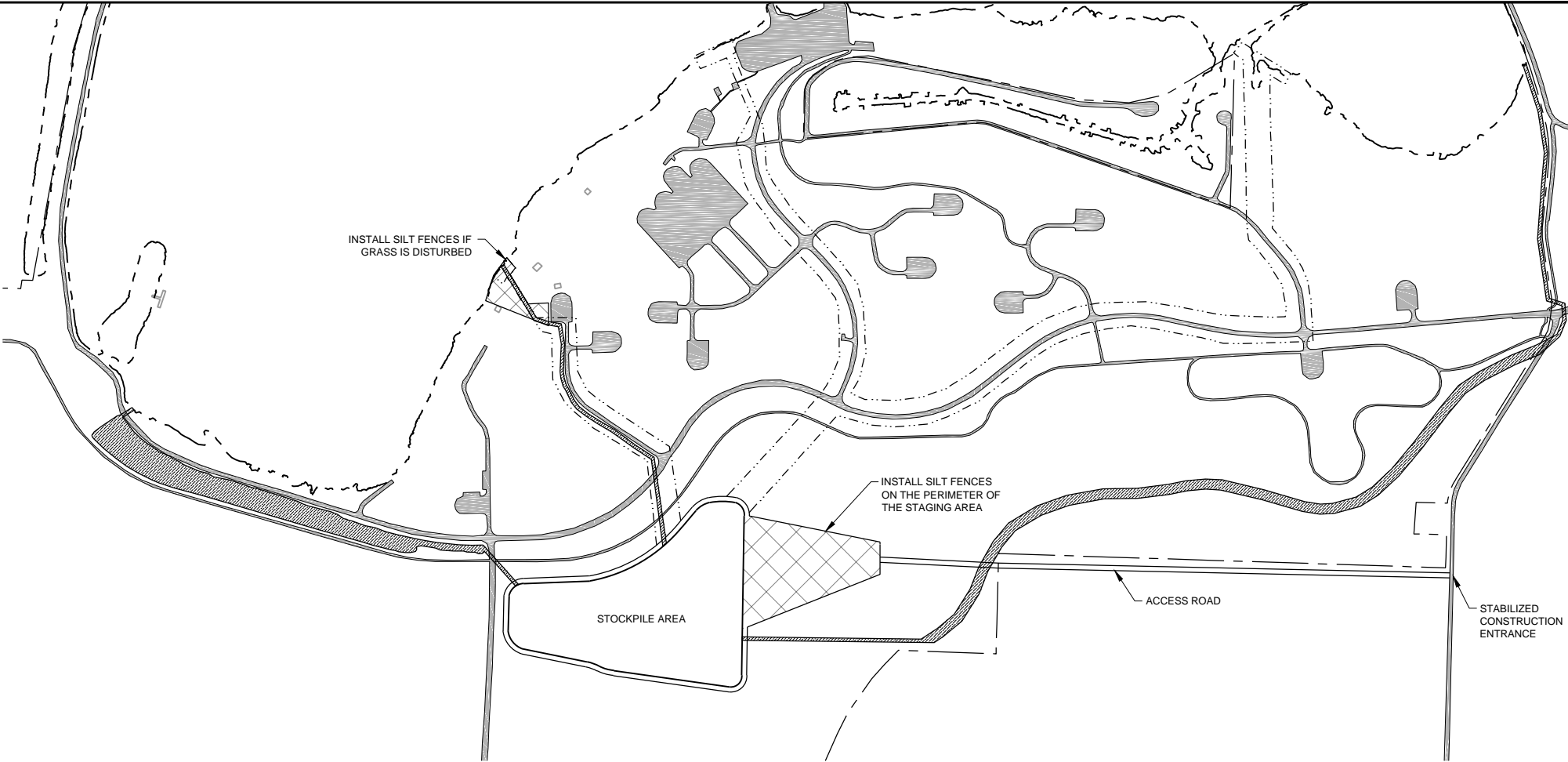
POTTAWATTAMIE COUNTY, IOWA

DESIGNED BY: \_\_\_\_\_ NSM  
 DRAWN BY: \_\_\_\_\_ NSM  
 CHECKED BY: \_\_\_\_\_ SEM  
 APPROVED BY: \_\_\_\_\_ MKS  
 PROJECT NO.: \_\_\_\_\_ 007.12.01  
 \_\_\_\_\_ JUNE 2015



STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

1. INSTALL SWPPP BEST MANAGEMENT PRACTICES (BMPs) PRIOR TO GRADING OPERATIONS. THE CONTRACTOR SHALL COMPLY WITH THE PROCEDURES SET FORTH ON THESE PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTROL OF ALL EROSION AND STORM WATER RUNOFF. THE REQUIREMENTS SET FORTH IN THESE CONTRACT DOCUMENTS SHALL BE CONSIDERED A MINIMUM GUIDELINE AND CONTRACTOR SHALL PROVIDE ADDITIONAL MEASURES AS NECESSARY TO ELIMINATE DAMAGE FROM EROSION AND STORM WATER RUNOFF AT NO COST TO THE OWNER.
2. SWPPP FACILITIES TO BE INSPECTED BY THE CONTRACTOR WEEKLY OR AFTER ANY ½" RUNOFF EVENT. REMOVE SEDIMENT FROM ANY SWPPP BMPs WITHIN 48 HOURS OF RUNOFF EVENT TO ENSURE PROPER BMP FUNCTION.
3. THE CONTRACTOR SHALL PERIODICALLY REMOVE ACCUMULATED SEDIMENT FROM BEHIND SILT FENCE AS DIRECTED BY THE ENGINEER. SILT FENCE SHALL BE KEPT IN GOOD REPAIR DURING THE LIFE OF THIS CONTRACT. MAINTENANCE OF ALL EROSION CONTROL ITEMS IS TO BE PERFORMED BY THE CONTRACTOR.
4. IF SEEDING CANNOT BE PERFORMED WITHIN 7 DAYS OF FINISHED GRADING, PLACE EROSION CONTROL BLANKETS ON DISTURBED AREAS WITH SLOPES 3:1 OR GREATER AND MULCH REMAINING DISTURBED AREAS.
5. CONTRACTOR SHALL MAINTAIN ALL DEVICES UNTIL THE VEGETATIVE COVER IS 75% ESTABLISHED. CONTRACTOR SHALL REMOVE ALL EROSION CONTROL DEVICES AND ESTABLISH GROUND COVER IN THE AREAS AFFECTED BY THE EROSION CONTROL DEVICES.
6. CONTRACTOR TO SEED ALL DISTURBED AREAS IN ACCORDANCE WITH SUDAS SEEDING REQUIREMENTS AS PER SUDAS SPECIFICATIONS DETAILED HERE:  
<http://www.iowasudas.org/manuals/specs/div9/9010.pdf> MAINTAINED TURF AREAS SHALL BE SEEDED WITH URBAN COVER CROP AND SEED MIX AND ALL OTHER AREAS TO BE SEEDED WITH RURAL COVER CROP AND SEED MIX.
7. THE DESIGNATED STOCKPILE AREA IS SURROUNDED BY BERMS AND NO DRAINAGE CAN LEAVE THE AREA WITHOUT PUMPS OR RETENTION BASINS WHICH SHALL INCORPORATE A SEDIMENT REMOVAL FEATURE PRIOR TO LEAVING THE SITE. ALL WATER DISCHARGED FROM STOCKPILE AREA IS TO BE CONVEYED TO LAKE MANAWA. SELECTED CONTRACTOR SHALL PROVIDE DETAILS FOR STOCKPILE MANAGEMENT AND OPERATIONS WHICH SHALL BECOME PART OF THE SWPPP PLAN.



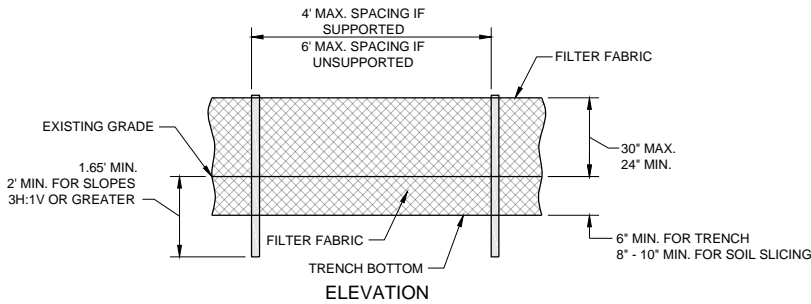
CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT
2. LENGTH - AS REQUIRED, BUT NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWENTY FIVE (25) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. FILTER WILL NOT BE REQUIRED ON A SINGLE FAMILY RESIDENCE LOT.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5H:1V SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

FILTER CLOTH FABRIC SPECIFICATIONS

PROPERTY	TEST PROCEDURE	LIGHT DUTY ENTRANCE		HEAVY DUTY ENTRANCE	
		MIN. FABRIC VALUE	MIN. FABRIC VALUE	MIN. FABRIC VALUE	MIN. FABRIC VALUE
GRAB TENSILE STRENGTH	ASTM D-4632	180 LBS.	250 LBS.	180 LBS.	250 LBS.
GRAB ELONGATION@ FAILURE	ASTM D-4632	50%	60%	50%	60%
MULLEN BURST STRENGTH	ASTM D-3786	250 PSI.	380 PSI.	250 PSI.	380 PSI.
PUNCTURE STRENGTH	ASTM D-4833	90 LBS.	125 LBS.	90 LBS.	125 LBS.
APPARENT OPENING SIZE	ASTM D-4751	0.2 MM	0.2 MM	0.2 MM	0.2 MM
AGGREGATE DEPTH		6 IN.	10 IN.	6 IN.	10 IN.

LIGHT DUTY ENTRANCE SHALL BE DEFINED AS SITES THAT HAVE BEEN GRADED TO SUBGRADE AND WHERE MOST TRAVEL WOULD BE SINGLE AXLE VEHICLES AND AN OCCASIONAL MULTI-AXLE TRUCK.  
HEAVY DUTY ENTRANCE SHALL BE DEFINED AS SITES WITH ONLY ROUGH GRADING AND WHERE MOST TRAVEL WOULD BE MULTIAXLE VEHICLES.



SILT FENCE SEDIMENT BARRIER DETAILS  
NO SCALE